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Plugging the Pipeline

Several weeks ago the National Education Goals Panel released its first annual report.* The panel was charged with monitoring progress toward the six goals which came from the historic education summit of the president and the nation's governors in 1989. Not unexpectedly, U.S. kindergarten through 12th grade (K–12) students lag in science and mathematics achievement. While disappointing overall, scores continue to be especially dismal for minority students, though there have been gains, but only at the lowest skill levels.

Meanwhile, at the other end of the science and engineering pipeline, we also find that the news is mixed. Comparing data from 1975 and 1990, a recent National Research Council report† indicates that the numbers of Ph.D.s in the engineering, life, and social sciences are increasing for American Indians, blacks, and Hispanics, albeit from very small base numbers. Ph.D.s in the physical sciences awarded to blacks decreased during this period, from 41 doctorates in 1975 to 23 in 1990.

We are not surprised by the small numbers at the end of the pipeline in light of the persistent leakage at the early stages. However, the major K–12 science and mathematics education reform efforts include improved participation and achievement by underserved groups as a central component of their goal statements. But the format of the goals panel report, with its roll call of the states, reminds us that the path to reform for these national pre-college efforts must run through the landscape of state and local school systems. There, scars from the budget wars pit the needs of education against basic social services and police and fire protection.

Despite the leaks from grades K–12, a significant proportion of minority students are entering our colleges and universities intending to major in the sciences and engineering. About a third of college-bound minority seniors who took the SATs in 1988, slightly above the national average, stated such intentions. While Hispanic students are 5% of those enrolled in higher education, they receive around 3% of bachelor's degrees, around 2% of master's degrees, and 1.6% of doctorates in science and engineering. Black students, 9% of those enrolled, receive about 5% of bachelor's degrees, between 2 and 3% of master's degrees, and around 2% of the doctorates in science and engineering. Clearly, the problems of losses from the pipeline continue beyond grades K–12. A study recently completed by AAAS≠ suggests that efforts undertaken within higher education to plug these leaks tend to be isolated and scattered rather than coherent, strategic, and part of the fabric of the institution, and its policies, practices, and system of rewards and incentives. The activities are often "fragile," the product of individual initiative and soft money support, where the loss of either can mean the end of the effort.

As in the pre-college arena, the lessons learned from interventions developed in the effort to increase the participation of minorities at the college level have general applicability in addressing the generic issue of undergraduate reform. The institutions that have distinguished themselves in delivering quality students to the graduate portion of the science and engineering pipeline from among minority students deserve praise and recognition. Efforts by individuals to increase the number of science and engineering doctorates among underrepresented groups and to establish an environment of support for such students within a department will be recognized by the newly established AAAS Mentor Award (see page 387). Those faculty who see to it that minority students receive the intellectual, financial, psychological, political, and professional support they need to make it through the pipeline also deserve to be praised and emulated.—SHIRLEY MALCOM, *Head, Education and Human Resources, AAAS.*

* "The National Education Goals Report: Building a Nation of Learners" (National Education Goals Panel, Washington, DC, 1991). † National Research Council, "Doctorate Recipients from United States Universities" (National Academy Press, Washington, DC, 1991). ≠ "Investing in Human Potential: Science and Engineering at the Crossroads" (AAAS, Washington, DC, 1991).